



Operations Research Seminar

Length Bias in the Measurements of Carbon Nanotubes

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To measure carbon nanotube lengths, atomic force microscopy and special software are used to identify and measure nanotubes on a square grid. Current practice does not include nanotubes that cross the grid, and as a result, the sample is length biased. The selection bias model can be demonstrated through Buffon's Needle Problem, which was extended to general curves that more realistically represent the shape of nanotubes observed on a grid. In this paper, the nonparametric maximum likelihood estimator is constructed for the length distribution of the nanotubes, and the consequences of the length bias are examined. Probability plots reveal that the corrected length distribution estimate provides a better fit to the Weibull distribution than the original selection-biased observations, thus reinforcing a previous claim about the underlying distribution of synthesized nanotube lengths.

Date: Thursday, January 31, 2008

Time: 15:00-16:00

Location: Glasgow 115